

## Proposed Additional Work Related to Beneficial Use, Northwest Aluminum Facility, The Dalles, Oregon

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This memorandum describes a proposed approach for collecting additional data at the Northwest Aluminum Company (NAC) facility in The Dalles, Oregon that may be of use in confirming the beneficial use of the zone tapped by NAC monitoring well 103 (MW-103). This well is distinctive because it is the only NAC monitoring well that exceeds the maximum contaminant level (MCL) for fluoride. Although DEQ (2012) has determined that the S-Aquifer at the site is not a reasonably likely potential source of drinking water based on the Department's beneficial water use process (and therefore the MCL would not be relevant to this aquifer under the Oregon Hazardous Substance Remedial Action Rules), CH2M HILL understands that EPA (2012) has expressed a differing opinion based on its groundwater classification guidance (EPA 1986).

The following sections summarize the hydrogeologic setting of the S-Aquifer and discuss a key element of EPA's groundwater classification guidance, followed by a description of proposed work to investigate if the zone in which MW-103 is completed has sufficient yield to be classified as a potential underground source of drinking water under EPA's classification scheme.

### S-Aquifer Description

The term "S-Aquifer" has been applied to the approximately 100-foot thick sequence of basalt flows and at least one sedimentary interbed situated above the A-Aquifer at the NAC facility, generally with groundwater occurring in water-bearing zones under unconfined conditions. This term has been used since the original CERCLA remedial investigation (RI) for the larger Martin Marietta former National Priorities List site, even though what is called the S-Aquifer is composed of several water bearing zones and confining layers within tabular fractured intervals of the Basalts of Lolo and Rosalia, as well as the Byron interbed (Geraghty & Miller 1987). As is typical of basalt, the water bearing zones grouped within the S-Aquifer are heterogeneous and locally have limited vertical or horizontal hydraulic continuity based on observed hydraulic heads in S-Aquifer monitoring wells and the variable stratigraphic position of different water bearing zones and confining layers.

Groundwater monitoring wells completed in the S-Aquifer are screened in four different zones, identified by Geraghty & Miller in the 1987 RI, from shallower to deeper:

- Lolo
- Byron interbed
- Rosalia subaerial
- Rosalia transitional

The deeper portion of the Rosalia flow beneath the transitional zone is referred to in the RI as the subaqueous zone and is characterized by glassy pillow basalt; a form of basalt deposited beneath (and rapidly cooled by) surface water. Later documents, such as the 1990 CERCLA groundwater monitoring report, identify this zone as the upper glassy or lower glassy zones within the Rosalia (Geraghty & Miller 1990). According to the RI, Geraghty

& Miller identified the upper subaqueous (glassy) zone as the A-Aquifer and the lower subaqueous (glassy) zone as the B-Aquifer.

S-Aquifer monitoring wells that have been installed for Lockheed Martin's monitoring program in or near the former Industrial Area (that is, the former reduction building/Casthouse and former cathode handling areas, as well as the offsite landfills owned by Lockheed Martin) have well screen bottoms ranging from 20.5 to 65 feet in depth, and are screened variously in the Lolo, Byron, or Rosalia subaerial/transitional zones. The only Lockheed S-Aquifer wells screened deeper than 65 feet are located east of River Road adjacent to the Columbia River, several hundred feet east of the Industrial Area of the site.

Because shallower water bearing zones were not encountered at the location of MW-103, it is screened in a somewhat deeper zone and has a well screen bottom at a depth of 72 feet. The zone in which MW-103 is completed also has a notably lower transmissivity (water bearing potential) than other area wells, routinely is pumped dry even under low pumping rates during purging, and may be more properly classified as a confining layer rather than an aquifer.

## EPA Groundwater Classification Guidance

EPA (1986) identified a threshold yield of 150 gallons per day as a delimiter between potential underground sources of drinking water and water bearing zones that are insufficient to serve as a potential drinking water source. The historical inclusion of multiple water bearing zones and confining layers of varying water yield potential beneath the umbrella term of the "S-Aquifer" (because they are situated above the A-Aquifer and may be unconfined) somewhat complicates a comparison between site data and the framework envisioned by EPA's guidance. However, it would be informative in the context of EPA's guidance to determine if the deeper, low-yield zone in which MW-103 is completed is capable of yielding more than 150 gallons per day.

## Proposed Work

CH2M HILL proposes to conduct an 8-hour yield test for MW-103 and extrapolate the total quantity of water produced over those 8 hours to a 24-hour day by multiplying it by three. The test will be run by using a decontaminated 2-inch electric centrifugal submersible sampling pump to pump the well dry (to represent the end of a hypothetical pumping cycle at the end of the period preceding the 8-hour test period). The amount of water recharging the well and capable of being pumped will be monitored for an 8-hour period thereafter. Between pumping cycles, the water level in the well will be checked periodically with a decontaminated water level indicator to reduce the potential for running the pump for an extended period without sufficient water to cool its motor. The amount of water produced by MW-103 during the 8-hour period will be tracked by pumping it into 55-gallon drums and measuring the depth of water in the drums to calculate a volume. Following the test, CH2M HILL will summarize the activities and results in a technical memorandum for submittal to DEQ.

## References

DEQ. 2012. Staff Report for the Northwest Aluminum Company site, ECSI Site I.D. 4793.

EPA. 2012. *U.S. Environmental Protection Agency, Region 10 Comments on and Objection to, the Oregon Department of Environmental Quality Proposed No Further Action Determination for Northwest Aluminum Company, the Dalles, Oregon*. Letter to Sheila Moore, Oregon DEQ from Deb Yamamoto, EPA Region 10. May 23, 2012.

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Geraghty & Miller, Inc. 1987. *Preliminary Remedial Investigation Report, Martin Marietta Reduction Facility, The Dalles, Oregon*. Unpublished consultant's report prepared for Martin Marietta Corporation, The Dalles, Oregon.

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